

Multi-isotopic constraints on the origin and fate of *n*-alkyl lipids in recent sediments

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Recent analytical advances now make it feasible to determine multiple isotopic characteristics of individual organic compounds within complex mixtures. In particular, hydrogen isotopic compositions and radiocarbon contents can now be readily determined to complement information derived from stable carbon isotopic analysis. When used in concert, these lines of geochemical information can yield important new insights into the origins and histories of the biomarker compounds, and lead to new and refined interpretation of molecular proxy records of paleoenvironmental variability.

We present multi-isotopic data on *n*-alkyl lipids isolated from a range of recent aquatic sediments in order to demonstrate both the complexity of geochemical signals preserved in environmental matrices, and the utility of multi-isotopic information in constraining inputs. In particular, we focus on long-chain lipids derived from terrestrial and marine precursors. Marked radiocarbon age and stable isotopic variability is apparent, even within closely-related homologous series of compounds recovered from the same sample. Based on multi-isotope characteristics, we interpret these variations in terms of differences in source versus reactivity of individual organic compounds, and discuss implications for interpretation of the sedimentary record.